

Climate Change : From Theory to Practice

Adaptation Response to Health Impacts Under the Maryland Climate Action Plan

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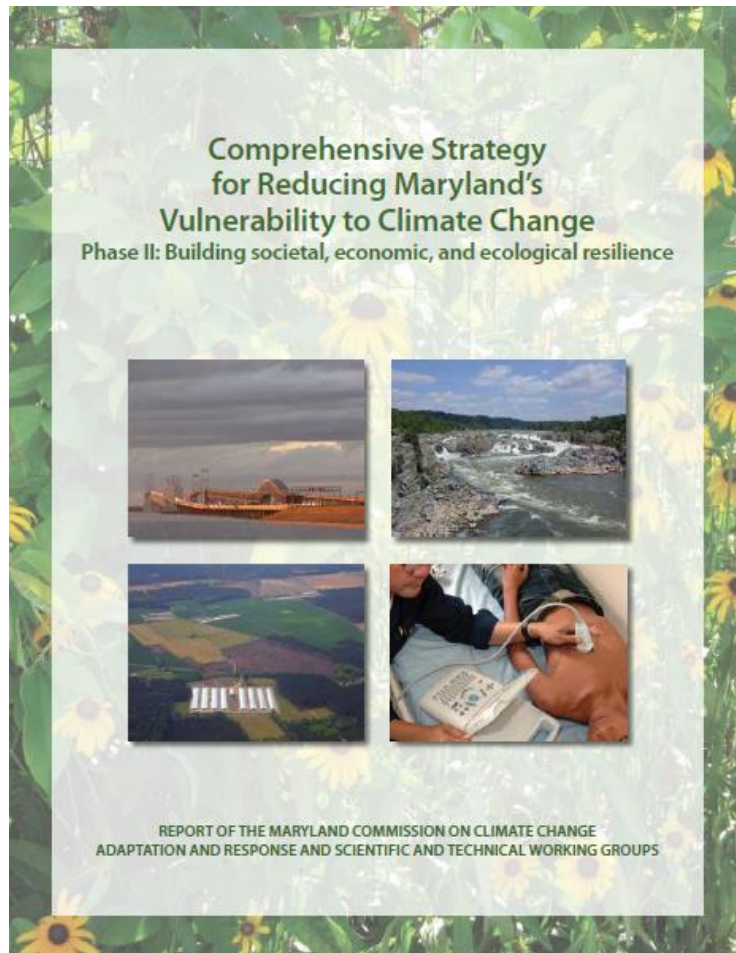


Outline

- Describe public health strategy in context of Maryland State Climate Action Plan
- Describe the Maryland Climate and Health Profile Report and its findings
- Discuss next steps for Maryland Public Health Strategy for Climate Change



Key Recommendations for Adaptation

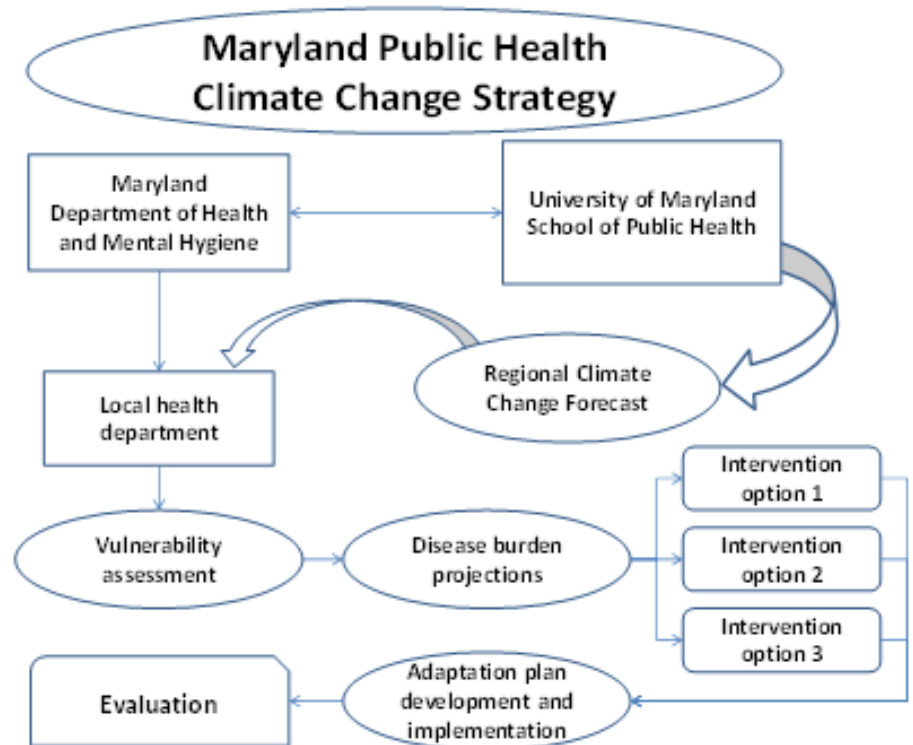


- Health
 - Conduct vulnerability assessments to gain a better understanding of risks and inform preventative responses
 - Integrate impact reduction strategies into State and local planning practices
 - Streamline and revise data collection and information dissemination channels



Public Health Strategy for Climate Change

- 2012 – CDC funds Maryland Public Health Strategy for Climate Change, using CDC BRACE framework (Building Resilience Against Climate Effects)
- Collaboration with UMCP, Wicomico, Prince George's, Washington Counties, Baltimore City



Climate and Health Profile Report

- Focuses on using historical health data, climate projections to anticipate likely impacts across the State
- Outcomes:
 - Injuries and temperature-related events
 - Respiratory diseases
 - Waterborne illness and injuries
 - Foodborne illness
 - Vector borne disease

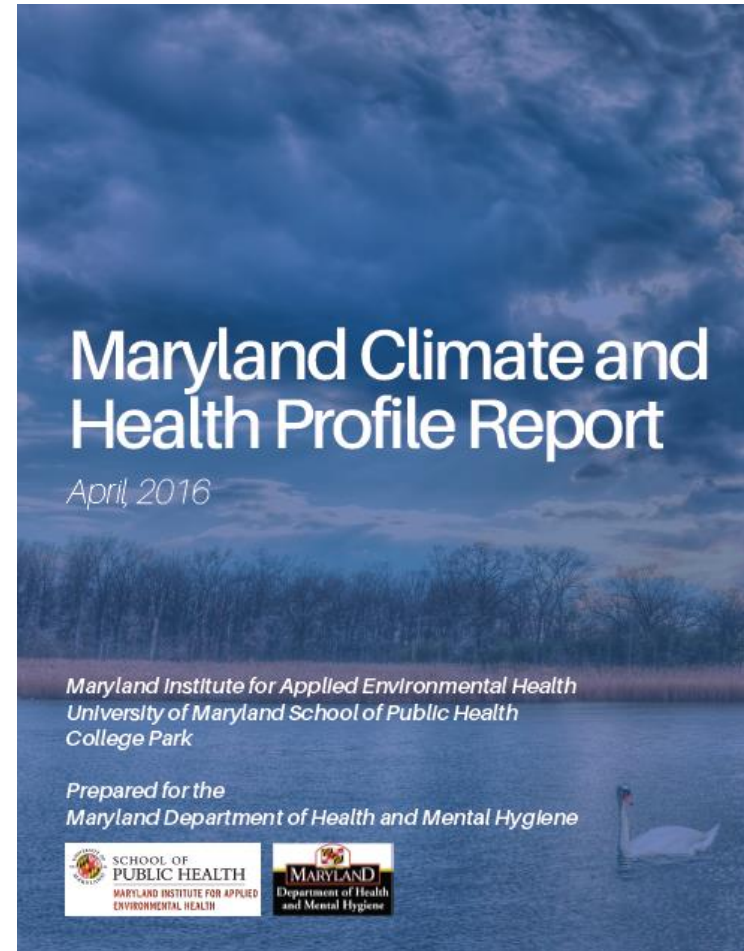
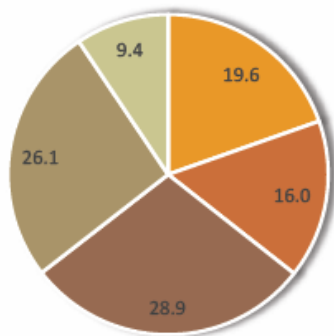


Figure 9. Demographic information for Prince George's County population, in 2010.

Demographic Information

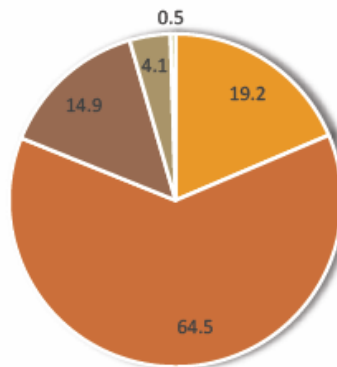
% Age Categories

- 0 - 14 years
- 15 - 24 years
- 25 - 44 years
- 45 - 64 years
- 65+ years



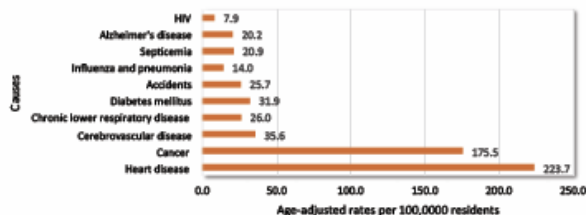
% Race/Ethnicity Categories

- White/Caucasian
- Black/African American
- Hispanic/Latino
- Asian/Pacific Islander
- Other

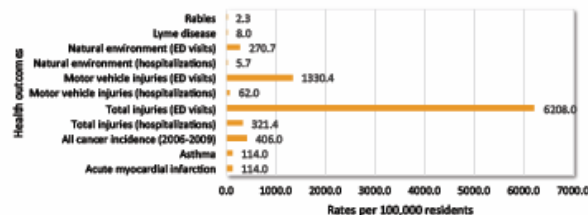


Health Data

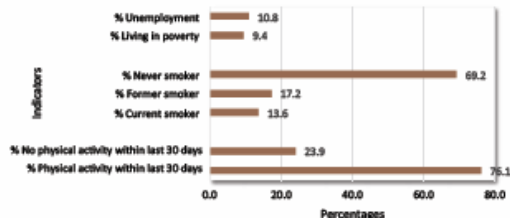
Top 10 Leading Causes of Death



Rates of Morbidities



SES and Behavioral Health



- Demographic data on local jurisdictions, including indicators of morbidity, mortality, socio-economic status

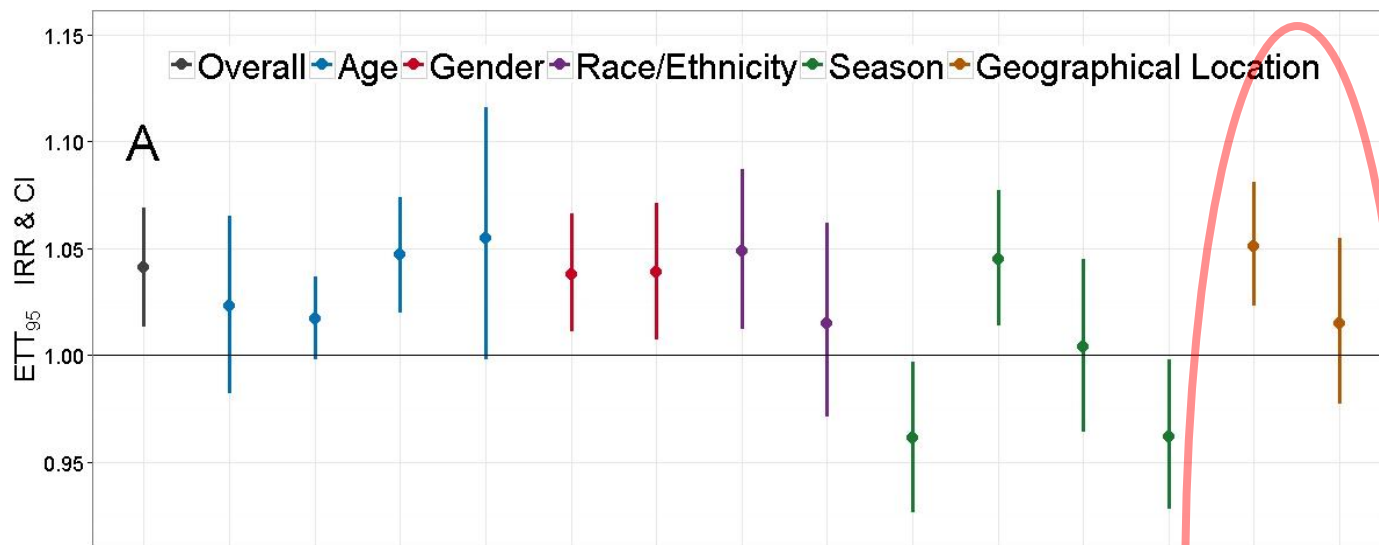


Historical Trends of Health Outcomes with Extreme Temperature and Precipitation

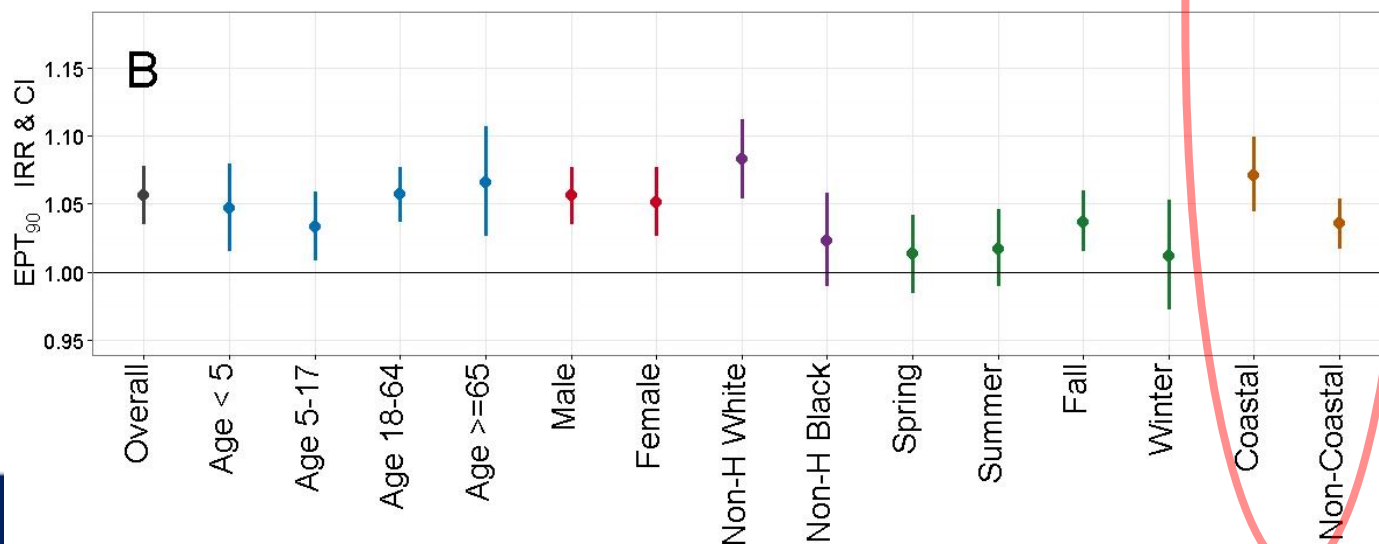


Salmonellosis: Incidence Rate Ratios and 95 % Confidence Intervals for Exposure to Extreme Events

IRR (95%CI)
for
Temperature



IRR (95%CI)
for
Precipitation



Vehicle Injury: Incidence Rate Ratios w/ 95% CI for Exposure to Extreme Events

Characteristics		Extreme Temp. (ETT ₉₅)	Extreme Precip. (EPT ₉₀)
Overall Model		1.01 [1.00-1.02]	1.23 [1.22-1.24]
Season			
	Spring	1.05 [1.03, 1.07]	1.20 [1.18, 1.21]
	Summer	1.09 [1.07, 1.10]	1.24 [1.22, 1.25]
	Fall	0.88 [0.86, 0.90]	1.32 [1.31, 1.34]
	Winter	0.97 [0.96, 0.99]	1.13 [1.12, 1.15]



Projections of Health Outcomes with Extreme Temperature and Precipitation Based on Climate Forecasts



Findings – Statewide and Regional

- Across the range of likely outcomes, estimated magnitude of impacts for the State as a whole:

Table 1. Projected change in disease rates associated with extreme heat events in Maryland during summer months.

HEALTH OUTCOME	RATES IN SUMMER*			PROJECTION RANKING
	2010	2040	% Change	
SALMONELLA INFECTION	6.1	7.8	28.0	SMALL
HOSPITALIZATION FOR HEART ATTACK	38.2	64.3	68.4	MODERATE
HOSPITALIZATION FOR ASTHMA	29.4	69.6	136.8	LARGE

**Rate per 100,000 residents, calculated as a seasonal average.*

- And for each pilot jurisdiction in different regions of the State:

Table 9. Projected change in disease rate in Prince George's County during summer months.

HEALTH OUTCOME	RATES IN SUMMER *			PROJECTION RANKING
	2010	2040	% Change	
SALMONELLA INFECTION	4.1	4.8	16.9	SMALL
HOSPITALIZATION FOR HEART ATTACK	24.2	29.7	22.5	SMALL
HOSPITALIZATION FOR ASTHMA	22.2	38.9	75.0	MODERATE

**=Rate per 100,000 residents, calculated as a seasonal average.*



Next Steps

- Maryland Climate Commission Adaptation and Response Working Group
- Continuing work on climate-health projections for State, and for local jurisdictions and planners
- Public engagement around adaptation planning
- Use of Environmental Public Health Tracking, other data display tools to help make data and projections available to individuals and groups



Outreach



Article

Vulnerable Populations Perceive Their Health as at Risk from Climate Change

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Abstract: Climate change is already taking a toll on human health coming decades. The relationship between risk perceptions and health threats has received little attention, even though an adaptation among particularly susceptible populations is to be We demonstrate that some people whose health will suffer change—due to social vulnerability, health susceptibility, and they are at risk. In a 2013 survey we measured Maryland residents' perceptions, and household social vulnerability characteristics (n = 2126). We paired survey responses with secondary data on and/or urban heat island to predict perceptions of personal and General health risk perceptions, political ideology, and climate. Yet, people in households with the following characteristics: a members with one or more medical conditions or disabilities; low and residence in a floodplain. In light of these results, climate vulnerable populations should emphasize protective actions in

Keywords: vulnerable populations; health risk perceptions; climate

1. Introduction

Public perceptions of climate change risk have primarily been viewed, awareness of physical changes in the environment, evidence [1,2]; the role of vulnerability in shaping people's assessment [3]. Indeed, whether vulnerability specifically due to the perceptions of their climate change risks has been little explored for climate adaptation planning. Public health organizations have communicating with vulnerable populations in order to promote these health threats [4]. Indeed, the Centers for Disease Control and Climate and Health Program in 2009 [5]. Maryland participates in Cities Initiative in which it is tasked with assessing state health vulnerability and implementing a climate and health plan, and conduct

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Full length article

Climate change, extreme events and increased risk of salmonellosis in Maryland, USA: Evidence for coastal vulnerability

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ABSTRACT

Background: Salmonella is a leading cause of acute gastroenteritis worldwide. Patterns of salmonellosis have been linked to weather events. However, there is a dearth of data regarding the association between extreme events and risk of salmonellosis, and how this risk may disproportionately impact coastal communities.
Methods: We obtained Salmonella case data from the Maryland Foodborne Diseases Active Surveillance Network (2002–2012), and weather data from the National Climatic Data Center (1980–2012). We developed exposure metrics related to extreme temperature and precipitation events using a 30 year baseline (1960–1989) and linked them with county-level salmonellosis data. Data were analyzed using negative binomial Generalized Estimating Equations.
Results: We observed a 4.1% increase in salmonellosis risk associated with a 1 unit increase in extreme temperature events (incidence rate ratio (IRR): 1.041; 95% confidence interval (CI): 1.013–1.069). This increase in risk was more pronounced in coastal versus non-coastal areas (3.1% vs 1.5%). Likewise, we observed a 5.6% increase in salmonellosis risk (IRR: 1.056; CI: 1.035–1.078) associated with a 1 unit increase in extreme precipitation events, with the impact disproportionately felt in coastal areas (7.1% vs 3.6%).
Conclusions: To our knowledge, this is the first empirical evidence showing that extreme temperature/precipitation events—that are expected to be more frequent and intense in coming decades—are disproportionately impacting coastal communities with regard to salmonellosis. Adaptation strategies need to account for this differential burden, particularly in light of ever increasing coastal populations.
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1. Introduction

Salmonella causes an estimated 1.2 million cases of acute gastroenteritis, including 23,000 hospitalizations and 450 deaths, in the United States each year (Scallan et al., 2011). In Maryland, 9529 cases of culture-confirmed cases of Salmonella infections were reported to the FoodNet program between 2002 and 2012. Salmonella infections have been attributed to a number of diverse sources, including produce, meats and eggs (Pres et al., 2014). Salmonellosis typically self-resolves in 5–7 days, although more serious sequelae, including septicemia and infections in immunocompromised individuals, require medical treatment (Hohmann, 2001). Salmonella infections proliferate

during seasons characterized by elevated temperatures and precipitation, which can amplify bacterial replication and transmission to surface water and food crops, potential sources of infection (Gjibovskii et al., 2014; Haley et al., 2009; Kovats et al., 2004; Lal et al., 2013; McCallie et al., 2012; Zhang et al., 2010).

Global climate change is expected to increase the frequency and intensity of extreme temperature and precipitation events (IPCC, 2013). A recent report by the Intergovernmental Panel for Climate Change (IPCC) suggests that recent trends in extreme temperature and precipitation events will continue to increase in future decades with more frequent and longer lasting heat waves (IPCC, 2013). A recent time series analysis also demonstrated a continued global increase in the frequency of the most extreme hot days over land, even during the hypothesized “global warming hiatus” (Senoi et al., 2014). Likewise, it is estimated that the frequency of extreme El Niño events—characterized by increased extreme heat days and heavy precipitation—will continue to rise in response to continued greenhouse warming (Cai et al., 2014).

Recent studies have provided evidence of an association between weather events and the incidence of Salmonella infections (Kovats

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Environmental Health

RESEARCH

Open Access



Exposure to extreme heat and precipitation events associated with increased risk of hospitalization for asthma in Maryland, U.S.A.

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studies have investigated and precipitation. How density, and duration in ma. The objective of our events and increased r time-stratified case-cros events and risk of hosp of extreme heat events Ratio (OR): 1.03, 95 % of heat events that occu precipitation events is 6, 1.17). Across age gr during the summer mo precipitation event was e to extreme heat and ased risk of hospitaliz y of extreme heat and Climate change, Extrem

Disease Control and 5.5 million American approximately 439,000 cally [1]. Annual costs s of productivity, medic s estimated to be \$56

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Climate Change & Energy

Public Attitudes, Behaviors & Policy Support

A Survey of Maryland Residents | Summer 2013



MARYLAND
DEPARTMENT OF HEALTH
& MENTAL HYGIENE



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